SEQUENCE LISTING

<110> Baehrecke, Eric H.

<120> GENES REGULATING PROGRAMMED CELL DEATH

<130> 4115-131

<160> 12

<170> PatentIn version 3.1

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<213> Drosophila melanogaster

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11

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Ala Arg Ala Gln Ala Glu Arg Thr Glu Lys Ser Lys Leu Asn Leu Leu
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Glu Thr Ser Glu Ile Lys Phe Pro Thr Ala Ser Thr Tyr Leu His Gln
       210   215   220

Leu Thr Leu Gln Lys Met Val Thr Gln Phe Lys Glu Lys Asn Glu Ser
225   230   235   240

Leu Gln Tyr Glu Thr Ser Asn Pro Thr Val Gln Leu Lys Ile Pro Gln
              245   250   255

Leu Arg Val Ser Ser Val Ser Lys Ser Gln Pro Asp Gly Ser Gly Leu
              260   265   270

Leu Asp Val Met Tyr Gln Val Ser Lys Thr Ser Ser Val Leu Glu Gly
              275   280   285

Ser Ala Leu Gln Lys Leu Lys Asn Ile Leu Pro Lys Gln Asn Lys Ile
       290   295   300

Glu Cys Ser Gly Pro Val Thr His Ser Ser Val Asp Ser Tyr Phe Leu
305   310   315   320

His Gly Asp Leu Ser Pro Leu Cys Leu Asn Ser Lys Asn Gly Thr Val
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Asp Gly Thr Ser Glu Asn Thr Glu Asp Gly Leu Asp Arg Lys Asp Ser
                340   345   350

Lys Gln Pro Arg Lys Lys Arg Gly Arg Tyr Arg Gln Tyr Asp His Glu
            355   360   365

Ile Met Glu Glu Ala Ile Ala Met Val Met Ser Gly Lys Met Ser Val
        370   375   380

Ser Lys Ala Gln Gly Ile Tyr Gly Val Pro His Ser Thr Leu Glu Tyr
385   390   395   400

Lys Val Lys Glu Arg Ser Gly Thr Leu Lys Thr Pro Pro Lys Lys Lys
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Leu Arg Leu Pro Asp Thr Gly Leu Tyr Asn Met Thr Asp Ser Gly Thr
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Gly Ser Cys Lys Asn Ser Ser Lys Pro Val
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cactttttatt gtatataaaa attatataca tcgccaggag gagctgcagc aacccactcc   240

13

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14

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15

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16

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17

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18

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Ser His Leu Asn Ile Glu Glu Gln Gln Pro Ile Ala Ile Ala Gly Ser
        35                  40                  45


Glu Asp Glu Pro Ser Gln Tyr Asn His Ser Ser Lys Glu Ile Ser Gln
    50                  55                  60


Ser Asn Pro Asn His Cys Lys Thr Glu Asn His Arg Leu Glu Gln Gln
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19

His Asn Gly Ser Gln Leu Leu Glu Glu Glu Asp Ser Glu Asn Asn Gln
                85   90   95

Thr Ser His Asp Ser Ser Arg Thr Pro Thr Pro Gly Ala Thr Ser Thr
            100   105   110

Pro Ser Pro Pro Pro Glu Pro Ile Asp Trp Arg Pro Ser Ala Lys Cys
            115   120   125

Asn Phe Cys Val Asn Gly Arg Leu Leu Thr Val Asn Ala Gln Gly Lys
        130   135   140

Leu Val Ala Glu Ser Ala Ala Thr Ala Thr Ser Ser Ser Thr Ser Asn
145   150   155   160

Ser His Ile His Gln His Asp Ser Asp Ser Asn Ser Ser Ala Ser Leu
            165   170   175

Pro His His Ile Ser Ser Ser Ser Ser Ser Asn Asn Asn Ser Ser Gly
            180   185   190

Asn Arg Ala Arg His Ile Ala Ala Ala Ser Ala Arg Ala Thr Pro Ala
        195   200   205

Ala Ala Thr Pro Ala Asn Ser Leu Glu Leu Tyr Lys Leu Leu Thr Gln
    210   215   220

Arg Ala Ala Lys Met Thr Ser Met Asp Ser Met Ala Ala Gln Leu Ala
225   230   235   240

Gln Phe Ser Leu Leu Ala Asp Phe Asn Leu Ile Asn Ser Leu Ala Ser
            245   250   255

Gln Gln Gln Gln Gln Gln Gln Gln Gln Ile Ala Ser Ala Val Thr Pro
            260   265   270

Thr Thr Ser Glu Val Ser Ala Ala Ala Ile Ser Pro Ala Leu Lys Asp
        275   280   285

Thr Pro Ser Pro Ser Val Asp Ala Pro Leu Asp Leu Ser Ser Lys Pro
    290   295   300

20

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Ser Pro Asn Ser Ser Ile Ser Gly Asp Val Lys Ser Val Arg Ala Cys
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Ala Thr Pro Thr Pro Ser Gly Arg Arg Ala Tyr Ser Glu Glu Asp Leu
            325             330             335


Ser Arg Ala Leu Gln Asp Val Val Ala Asn Lys Leu Asp Ala Arg Lys
            340             345             350


Ser Ala Ser Gln His His Glu Gln Arg Ser Ile Leu Asp Asn Arg Leu
            355             360             365


Phe Lys Met Lys His His Asp Gln Glu Gln Asp His Asp Gly Asp Glu
        370             375             380


Leu Glu Asp Ser Asn Asp Asp Ala Glu Ala Glu Val Asp Ser Asn Ala
385                 390             395                 400


Ser Thr Pro Val Tyr Pro Ala Glu Phe Ala Arg Ala Gln Leu Arg Lys
            405             410             415


Leu Ser His Leu Ser Glu His Asn Gly Ser Asp Leu Gly Glu Asp Val
            420             425             430


Asp Arg Gly Ser Pro Lys Met Gly Arg His Pro Ala Cys Gly Asn Ala
        435             440             445


Ser Ala Asn Gln Gly Ala Pro Ala Ser Ile Pro Leu Asp Ala Asn Val
    450             455             460


Leu Leu His Thr Leu Met Leu Ala Ala Gly Ile Gly Ala Met Pro Lys
465             470             475             480


Leu Asp Glu Thr Gln Thr Val Gly Asp Phe Ile Lys Gly Leu Leu Val
            485             490             495


Ala Asn Ser Gly Gly Ile Met Asn Glu Gly Leu Leu Asn Leu Leu Ser
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Ala Ser Gln Glu Asn Ser Asn Gly Asn Ala Ser Leu Leu Leu Gln Gln
            515             520             525
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21

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Gln Gln His Gln Gln His His Gln Gln His His Gln Gln Gln Gln Gln
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Gln Gln His Val Ala Ala Tyr Arg His Arg Leu Pro Lys Ser Glu Thr
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Pro Glu Thr Asn Ser Ser Leu Asp Pro Asn Asp Ala Ser Glu Asp Pro
                565                 570                 575

Ile Leu Lys Ile Pro Ser Phe Lys Val Ser Gly Pro Ala Ser Ser Ser
                580                 585                 590

Ser Leu Ser Pro Gly Gly Leu Val Gly Gly His His His Pro Leu Asn
        595                 600                 605

Asn Asn Asn Ser Leu Ser Ile Ser Asn Asn Ser Asn His Ser Ser Asn
    610                 615                 620

Ser His Arg Asn Gly Ser Asn Arg Ser Pro His Ser Ala Ser Pro Met
625                 630                 635                 640

Leu Ala Ala Ala Val Ala Gln Gly Gly Tyr Ser Ala Gly Asn Ser Leu
                645                 650                 655

Leu Thr Ser Ser Ser Ser Ser Ile Gln Lys Met Met Ala Ser Asn Ile
            660                 665                 670

Gln Arg Gln Ile Asn Glu Gln Ser Gly Gln Glu Ser Leu Arg Asn Gly
    675                 680                 685

Asn Val Ser Asp Cys Ser Ser Asn Asn Gly Gly Ser Ser Ser Leu Gly
    690                 695                 700

Tyr Lys Lys Pro Ser Ile Ser Val Ala Lys Ile Ile Gly Gly Thr Asp
705                 710                 715                 720

Thr Ser Arg Phe Gly Ala Ser Pro Asn Leu Leu Ser Gln Gln His His
                725                 730                 735

Ser Ala His His Leu Thr His Gln Gln Gln Gln Gln Gln Leu Ser Ala
                740                 745                 750
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 Asn Tyr Asp Arg Asp Ser Leu Val Glu Ala Val Lys Ala Val Gln Arg
        770               775               780

 Gly Glu Met Ser Val His Arg Ala Gly Ser Tyr Tyr Gly Val Pro His
 785               790               795               800

 Ser Thr Leu Glu Tyr Lys Val Lys Glu Arg His Leu Met Arg Pro Arg
               805               810               815

 Lys Arg Glu Pro Lys Pro Gln Pro Asp Leu Val Gly Leu Thr Gly Pro
               820               825               830

 Ala Asn Lys Leu Gln Leu Asp Lys Leu Lys Ala Gly Pro His Gly Gly
        835               840               845

 Ser Lys Leu Ser Asn Ala Leu Lys Asn Gln Asn Asn Gln Ala Ala Ala
        850               855               860

 Ala Ala Ala Ala Ala Ala Ala Ala Ala Ala Ala Ala Thr Pro Asn Gly
 865               870               875               880

 Leu Lys Leu Pro Leu Phe Glu Ala Gly Pro Gln Ala Leu Ser Phe Gln
               885               890               895

 Pro Asn Met Phe Trp Pro Gln Thr Asn Ala Thr Asn Ala Tyr Gly Leu
               900               905               910

 Asp Phe Asn Arg Ile Thr Glu Ala Met Arg Asn Pro Gln Ala Ser Asn
        915               920               925

 His His Gly Leu Met Lys Ser Ala Gln Asp Met Val Glu Asn Val Tyr
        930               935               940

 Asp Gly Ile Ile Arg Lys Thr Leu Gln Ala Ser Glu Gly Asn Gly Ser
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 Ala Ala Gly Asn Gly Ser Asn Gly Ser Asn Gly Asn Gly His Gly His
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 Gly His Gly His Gly His Ala Leu Leu Asp Gln Leu Leu Val Lys Lys
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Thr Pro Leu Pro Phe Thr Asn His Arg Asn Asn Asp Tyr Ala Ala Thr
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Cys Ser Ser Ala Ser Gly Glu Ser Val Lys Arg Ser Gly Ser Pro
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Met Gly Asn Tyr Ala Asp Ile Lys Arg Glu Arg Leu Ser Ala Asp
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Ser Gly Gly Ser Ser Asp Glu Glu His Ser Ala Ser His Ile Asn
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Asn Asn Asn Ser Asp Leu Ala His Asn Lys Asn Lys Ser Gly Gly
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Gly Gly Gly Gly Gly Gly Asn Gly Gln Thr Asn Gly Asn Gly Arg
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Ser Ser Arg Met Thr Ser Arg Asp Asp Ser Glu Thr Asp Ala Ser
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Ser Phe Lys Ser Gly Glu Asn Gly Gly Gln Gln Asn His Lys Met
    1100   1105   1110

Met Asp Leu Asn Gly Gly Ser Ser Ser Ser Ser His Ile Lys Cys
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Glu Ser Glu Ala Ala Thr Gly His His Ser Pro Gly His His Thr
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Cys Met Gly Arg Arg Gln Trp Lys His Tyr Gln Asp Lys Leu Thr Cys
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Ser His Leu Asn Ile Glu Glu Gln Gln Pro Ile Ala Ile Ala Gly Ser
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Glu Asp Glu Pro Ser Gln Tyr Asn His Ser Ser Lys Glu Ile Ser Gln
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Ser Asn Pro Asn His Cys Lys Thr Glu Asn His Arg Leu Glu Gln Gln
65   70   75   80

His Asn Gly Ser Gln Leu Leu Glu Glu Glu Asp Ser Glu Asn Asn Gln
                85   90   95

Thr Ser His Asp Ser Ser Arg Thr Pro Thr Pro Gly Ala Thr Ser Thr
                100   105   110

Pro Ser Pro Pro Pro Glu Pro Ile Asp Trp Arg Pro Ser Ala Lys Cys
        115   120   125

Asn Phe Cys Val Asn Gly Arg Leu Leu Thr Val Asn Ala Gln Gly Lys
        130   135   140

Leu Val Ala Glu Ser Ala Ala Thr Ala Thr Ser Ser Ser Thr Ser Asn
145   150   155   160

Ser His Ile His Gln His Asp Ser Asp Ser Asn Ser Ser Ala Ser Leu
                165   170   175

Pro His His Ile Ser Ser Ser Ser Ser Ser Asn Asn Asn Ser Ser Gly
                180   185   190

Asn Arg Ala Arg His Ile Ala Ala Ala Ser Ala Arg Ala Thr Pro Ala
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25

Ala Ala Thr Pro Ala Asn Ser Leu Glu Leu Tyr Lys Leu Leu Thr Gln
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Arg Ala Ala Lys Met Thr Ser Met Asp Ser Met Ala Ala Gln Leu Ala
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Gln Phe Ser Leu Leu Ala Asp Phe Asn Leu Ile Asn Ser Leu Ala Ser
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Gln Gln Gln Gln Gln Gln Gln Gln Gln Ile Ala Ser Ala Val Thr Pro
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Thr Thr Ser Glu Val Ser Ala Ala Ala Ile Ser Pro Ala Leu Lys Asp
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Thr Pro Ser Pro Ser Val Asp Ala Pro Leu Asp Leu Ser Ser Lys Pro
    290   295   300

Ser Pro Asn Ser Ser Ile Ser Gly Asp Val Lys Ser Val Arg Ala Cys
305   310   315   320

Ala Thr Pro Thr Pro Ser Gly Arg Arg Ala Tyr Ser Glu Glu Asp Leu
                325   330   335

Ser Arg Ala Leu Gln Asp Val Val Ala Asn Lys Leu Asp Ala Arg Lys
                340   345   350

Ser Ala Ser Gln His His Glu Gln Arg Ser Ile Leu Asp Asn Arg Leu
                355   360   365

Phe Lys Met Lys His His Asp Gln Glu Gln Asp His Asp Gly Asp Glu
    370   375   380

Leu Glu Asp Ser Asn Asp Asp Ala Glu Ala Glu Val Asp Ser Asn Ala
385   390   395   400

Ser Thr Pro Val Tyr Pro Ala Glu Phe Ala Arg Ala Gln Leu Arg Lys
                405   410   415

Leu Ser His Leu Ser Glu His Asn Gly Ser Asp Leu Gly Glu Asp Val
                420   425   430

26

Asp Arg Gly Ser Pro Lys Met Gly Arg His Pro Ala Cys Gly Asn Ala
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Ser Ala Asn Gln Gly Ala Pro Ala Ser Ile Pro Leu Asp Ala Asn Val
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Leu Leu His Thr Leu Met Leu Ala Ala Gly Ile Gly Ala Met Pro Lys
465   470   475   480

Leu Asp Glu Thr Gln Thr Val Gly Asp Phe Ile Lys Gly Leu Leu Val
                 485   490   495

Ala Asn Ser Gly Gly Ile Met Asn Glu Gly Leu Leu Asn Leu Leu Ser
             500   505   510

Ala Ser Gln Glu Asn Ser Asn Gly Asn Ala Ser Leu Leu Leu Gln Gln
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Gln Gln His Gln Gln His His Gln Gln His His Gln Gln Gln Gln Gln
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Gln Gln His Val Ala Ala Tyr Arg His Arg Leu Pro Lys Ser Glu Thr
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Pro Glu Thr Asn Ser Ser Leu Asp Pro Asn Asp Ala Ser Glu Asp Pro
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Ile Leu Lys Ile Pro Ser Phe Lys Val Ser Gly Pro Ala Ser Ser Ser
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Ser Leu Ser Pro Gly Gly Leu Val Gly Gly His His His Pro Leu Asn
         595   600   605

Asn Asn Asn Ser Leu Ser Ile Ser Asn Asn Ser Asn His Ser Ser Asn
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Ser His Arg Asn Gly Ser Asn Arg Ser Pro His Ser Ala Ser Pro Met
625   630   635   640

Leu Ala Ala Ala Val Ala Gln Gly Gly Tyr Ser Ala Gly Asn Ser Leu
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Leu Thr Ser Ser Ser Ser Ser Ile Gln Lys Met Met Ala Ser Asn Ile

27

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Asn Val Ser Asp Cys Ser Ser Asn Asn Gly Gly Ser Ser Ser Leu Gly
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Tyr Lys Lys Pro Ser Ile Ser Val Ala Lys Ile Ile Gly Gly Thr Asp
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Thr Ser Arg Phe Gly Ala Ser Pro Asn Leu Leu Ser Gln Gln His His
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Ser Ala His His Leu Thr His Gln Gln Gln Gln Gln Gln Leu Ser Ala
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Gln Glu Ala Leu Gly Lys Gly Thr Arg Pro Lys Arg Gly Lys Tyr Arg
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Asn Tyr Asp Arg Asp Ser Leu Trp Arg Arg Ser Arg Arg Cys Arg Glu
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Leu Lys Cys Arg Phe Ile Glu Arg Val Ala Thr Met Arg Thr Ala Phe
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His Thr Gly Val Gln Gly Gln Gly Thr Ser Pro Asp Ala Thr Ala Gln
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Ala Arg Ala Gln Ala Ala Ala Arg Ser Arg Arg Pro Asp Arg Thr Ser
            820                 825                 830

Gln Gln Ala Ala Ala Gly Gln Thr Glu Gly Gly Thr Thr Trp Trp Leu
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Gln Ala Glu Gln Cys Pro Gln Glu Pro Lys Gln Ser Gly Gly Cys Gly
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Gly Gly Gly Gly Ser Ser Ser Ser Gly Arg Cys His Ala Gln Arg Pro
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Glu Thr Ala Pro Phe Arg Gly Gly Ser Thr Gly Val Ile Leu Ser Ala
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28

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Leu Gln Ser His His Gly Gly Asp Ala Glu Phe Pro Gly Leu Gln Ser
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Pro Arg Leu Met Lys Ser Ala Gln Asp Met Val Gly Glu Arg Leu Arg
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Trp His His Gln Glu Asp Ala Ala Gly Glu Gln Gly Asn Gly Ser Ala
945             950             955             960

Ala Gly Asn Gly Ser Asn Gly Ser Asn Gly Asn Gly His Gly His Gly
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His Gly His Gly His Ala Leu Leu Asp Gln Leu Leu Val Lys Lys Thr
            980             985             990

Pro Leu Pro Phe Thr Asn His Arg  Asn Asn Asp Tyr Val  Val Thr Cys
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Ser Ser  Ala Ser Gly Glu Ser  Val Lys Arg Ser Gly  Ser Pro Met
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Gly Asn  Tyr Ala Asp Ile Lys  Arg Glu Ala Leu Ser  Ala Asp Ser
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Gly Gly  Ser Ser Asp Glu Glu  His Ser Ala Ser His  Ile Asn Asn
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Asn Asn  Ser Asp Leu Ala His  Asn Lys Asn Lys Ser  Gly Gly Gly
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Gly Gly  Gly Gly Asn Gly Gln  Thr Asn Gly Asn Gly  Arg Ser Ser
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Arg Met  Thr Ser Arg Asp Asp  Ser Glu Thr Asp Ala  Ser Ser Phe
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Lys Ser  Gly Glu Asn Gly Gly  Gln Gln Asn His Lys  Met Met Asp
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29

Leu Asn Gly Gly Arg Ala Ala Ala Val Thr Ser Ser Ala Asn Arg
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Tyr Cys Thr Arg Ser Trp Ser Arg Ser Arg Pro Ser Lys Trp Thr
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Arg Arg Phe Ser Tyr Trp Ser Ser Arg Trp Thr Arg Ile Gln Arg
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Ser Pro Trp His Arg Trp Ser Pro Thr Thr Thr Val Ser Trp Arg
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Arg Glu Gly Glu His Gln Ile Lys Pro Arg Phe Leu Val Val Pro
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aaataataag aacttaatta catgaaacta attaaataca aagagatgtc caaaagctca    8700

gataaaatcc aagcagccta aagtcgattg tacttttctt ttttctatcc acaaatacaa    8760

ccaacaacaa ccaacaacaa caacaacagc agcaaccaca atttaattaa acaatagtac    8820

tactctaact acagaactta aatagccaca agtaaataga attagccaca gcaatttaac    8880

tttataacaa gatgcccaaa cacaggacac tcacagaaac gtttcttcaa aacagatttg    8940
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 tactcttagc cacataaccg atacgataca atagccactt aattaggatc gatcatagcc   9000

aagcaataga atcagatatc agatacaaaa ctcagaaccg gaaacaggaa atcgtcaatc   9060

gcgaatcgga aaaaagaagc agcaccaaat cgaactgcaa aggcaaaacc ccagtatatt   9120

aataatgggg agaaacataa tgataaacca tttttatttc aattattaac ttataacaca   9180

acatcaccac cacagcttcc cacagtttca gttacacagg accaccacca tagccctagg   9240

aaattatatt cataattaat caatcaatca atccgtaaaa ccaacaactt caatagttat   9300

aagcaattgg cgtcaaaaaa aaaaaagcg aaaacaacca aaatcttagc caggcaaaag   9360

ttttgagcat attttttcatt attttttacaa caaacaaaca aactgatgta agtacaattc   9420

ataaaattag actttcggta aactataata aagaaaatag agcagaaaat aacatttttt   9480

ttttgcatta cataattgct acaaaattca aaaacaaaga acgattttttt agtggaaaac   9540

aaaagccaat aagcaaataa aaagaat                                       9567
```

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